

Exhibit A

Rev. 15i, 12/00

## Intel Invention Disclosure

Attorney-Client Privileged Communication  
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JUL 13 2001

Date: 07/09/01

mobile  
platform / IAG / MPG / MTE

It is important to provide accurate and detailed information on this form. The information will be used to evaluate your invention for possible filing as a patent application. When completed and signed, please return this form to the Legal Department at JF3-147. You can submit electronically via e-mail to "invention disclosure submission" if all of the information is electronic, including drawings and supervisor approval. If you have any questions, please call 264-0444.

RealMedia™ files are linked to portions of this form where you see the media icon. Click these icons to view help.

☒ Overview of this form (please take a moment to view this multimedia presentation).

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JUL 16 2001

PATENT DATABASE GROUP  
INTEL LEGAL TEAM

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2. ☒ Title of invention: Use of graded evaporation section area of heat pipe for the CPU package with IHS in mobile computers
3. ☒ What technology/product/process does it relate to? (be specific if you can)  
TMG/Thermomechanical
4. ☒ Include several key words (and/or code name) to describe the technology area of the invention in addition to #3 above. Heat pipe, graded evaporator section, package
5. ☒ Stage of development. (i.e. % complete, simulations done, test chips if any, etc.)  
Simulations done
6. ☒ (a) Has description of your invention been, or will it shortly be, published outside of Intel? (check one please)  
☐ Yes ☒ No  
If yes, was the manuscript submitted for pre-publication approval?  
☐ Yes ☐ No  
Identify the publication and the date published.  
Title:  
Date:
- ☒ (b) Has your invention been used/sold or planned to be used/sold by Intel or others?  
☐ Yes ☒ No  
If yes, date was or will be sold?  
Date:
- ☒ (c) Does this invention relate to technology that is or will be covered by a SIG(special interest group)/Standard/Specification? (check one please)  
☐ Yes ☒ No  
If yes, name of SIG/Standard/Specification?  
Name:
- (d) If the invention is embodied in a semiconductor device, what is the actual or anticipated date of tapeout?  
Date:

- ☒ (e) If the invention is software, what is the actual or anticipated date of any beta tests outside of Intel?

Date:

7. Was the invention conceived or constructed in collaboration with anyone other than an Intel blue badge employee or in performance of a project involving entities other than Intel, e.g. government, other companies, universities or consortia?

☐ Yes ☒ No

If yes, please give the name of the individual or entity.

Name:

8. Is this invention related to any other invention disclosure that you have recently submitted?

☐ Yes ☒ No

If yes, please give the title and inventors on the disclosure.

Title:

Inventors:

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**PLEASE READ AND FOLLOW DIRECTIONS  
ON HOW TO WRITE A DESCRIPTION OF YOUR INVENTION**

Please enter a description of the invention into this form as prescribed below. Use may insert pictures or text as needed.

1. ☒ Describe in detail what components of the invention are and how the invention works.

**Description:** For most of the high performance CPU's with flip chip package (e.g. Intel CPU), integrated heat spreader (IHS) is attached on top of the silicon die for reducing hot spot issues associated with small die sizes. IHS is made with a thick copper plate (~1.5 mm), which helps spread heat through its thickness.


In mobile computers, where a RHE-type (Remote Heat Exchanger) thermal solution has been widely employed, uniform HP width is used throughout the whole heat pipe length. In the present invention, different HP widths are proposed between the evaporative region and the other section of the heat pipes, as illustrated in the attached figure. As shown in the figure, evaporator section of the HP is designed to cover the whole IHS area of the CPU package in order to maximize the evaporation area, and hence, improve the heat pipe thermal performance.

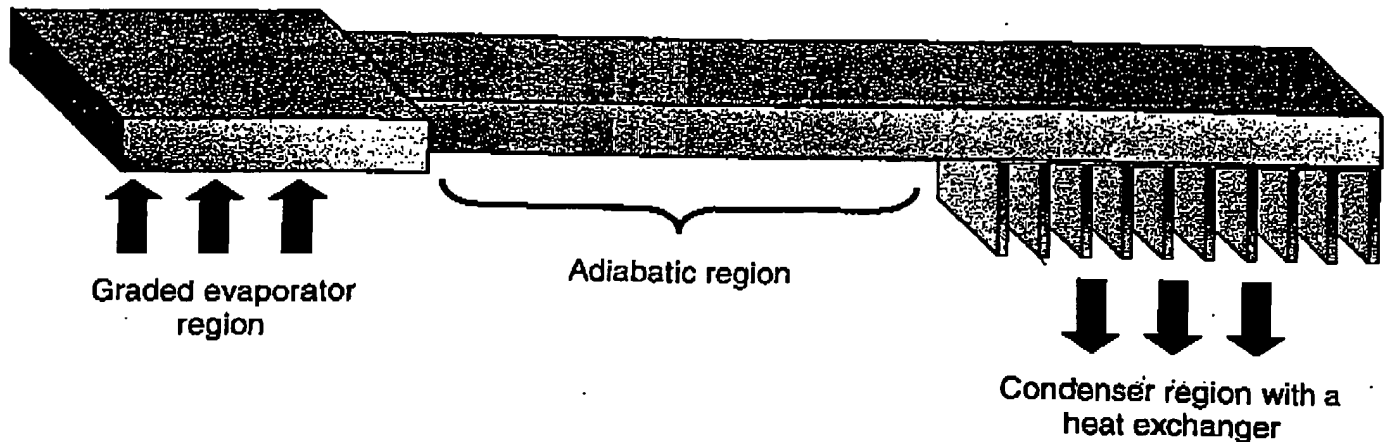
2. ☒ Describe advantage(s) of your invention over what is now done.

**Advantages:** Improving evaporative thermal performance of heat pipes.

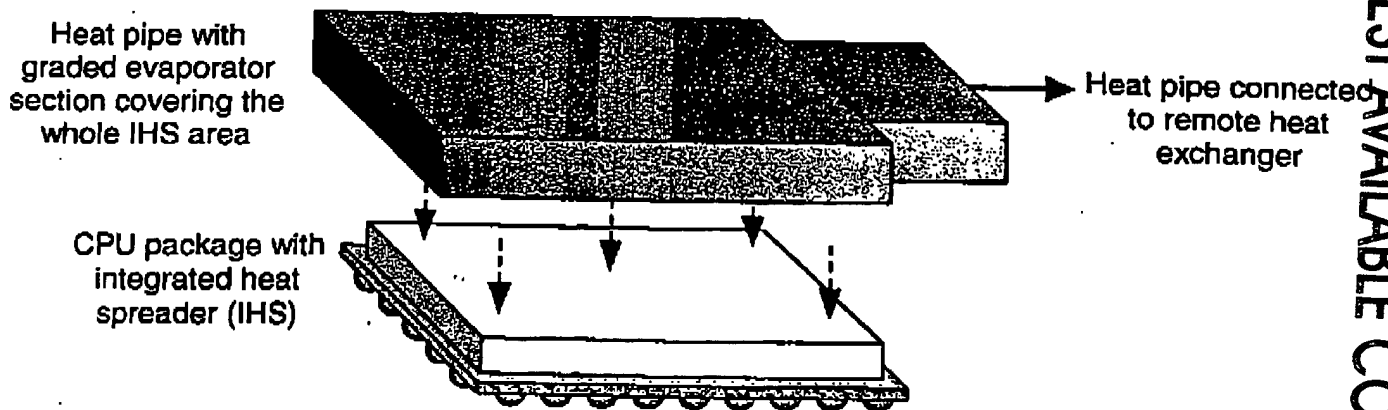
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3.  You MUST include at least one figure illustrating the invention. If the invention relates to software, include a flowchart or pseudo-code representation of the algorithm.



(a) Overview of the current invention



(b) Application of the current invention with IHS CPU package

**Figure. Schematic of heat pipe with graded evaporator section area**

4. Value of your invention to Intel (how will it be used?).

Describe value: Allows more heat dissipation for mobile computers, leading to air-cooling capabilities extended.

5. ☒ Explain how your invention is novel. If the technology itself is not new, explain what makes it different.

How is it novel? To inventor's knowledge, the concept of using graded heat pipe area has never been applied in electronic cooling designs, and certainly not for the purpose or in a way described above.

6. ☒ Identify the closest or most pertinent prior art that you are aware of.

Prior art? None

7. ☒ Who is likely to want to use this invention or infringe the patent if one is obtained and how would the infringement be detected? Whoever designs heat pipe thermal solutions for cooling of high heat-flux electronic devices (e.g. Intel CPU). The infringement can be detected by visually inspecting the heat pipe products.

☒ Ready to Submit? Check here first.

☒ HAVE YOUR SUPERVISOR READ, DATE AND SIGN COMPLETED FORM OR FORWARD IT ELECTRONICALLY VIA E-MAIL TO INVENTION.DISCLOSURE.SUBMISSION

DATE: 7/10/01

SUPERVISOR:



BY THIS SIGNING, I (SUPERVISOR) ACKNOWLEDGE THAT I HAVE READ AND UNDERSTAND THIS DISCLOSURE, AND RECOMMEND THAT THE HONORARIUM BE PAID

When completed and signed, please return this form to the Legal Department at JF3-147. You can submit electronically via e-mail to [invention.disclosure.submission@intel.com](mailto:invention.disclosure.submission@intel.com) if all of the information is electronic, including drawings and supervisor approval. If you have any questions, please call 264-0444.

Attach any additional relevant information below:

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